

Message

From: Hathaway, Margaret [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=904BA6BDE9364F13A5ACC32C01DF7425-HATHAWAY, MARGARET]
Sent: 6/3/2020 3:21:54 PM
To: Bish, Mandy D. [bishm@missouri.edu]
CC: Bradley, Kevin [bradleyke@missouri.edu]; Kenny, Daniel [Kenny.Dan@epa.gov]
Subject: RE: Dicamba EPA Check-In

Hello Mandy:

Thank you for much for these follow-up clarifications! I've shared this information with the dicamba team.

Take care,
Meg

Margaret Hathaway (Meg)
Senior Regulatory Specialist
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From: Bish, Mandy D. <bishm@missouri.edu>
Sent: Tuesday, May 19, 2020 1:49 PM
To: Hathaway, Margaret <Hathaway.Margaret@epa.gov>
Cc: Bradley, Kevin <bradleyke@missouri.edu>; Kenny, Daniel <Kenny.Dan@epa.gov>
Subject: Re: Dicamba EPA Check-In

Hi Meg,

I'm sorry for the delay in response. Please find my answers below in blue text.

Let me know if you have more q's, and thanks again,
Mandy

From: "Hathaway, Margaret" <Hathaway.Margaret@epa.gov>
Date: Thursday, May 7, 2020 at 7:47 AM
To: "Bish, Mandy D." <bishm@missouri.edu>
Cc: "Bradley, Kevin" <bradleyke@missouri.edu>, "Kenny, Daniel" <Kenny.Dan@epa.gov>
Subject: RE: Dicamba EPA Check-In

Good morning, Mandy:

EFED thanks you for this rainfall-related data and has the following clarification questions for your consideration. Some the answers to these questions may be in the remaining data you mentioned you were still working on.

List of questions from EPA:

1. Where were the bioassay plants positioned relative to the application sites? Within the treated area; ~6 to 12" above the canopy

2. Were the bioassay plants nontolerant for dicamba but tolerant for glyphosate? Bioassay plants were non-tolerant to dicamba. Most of the bioassay plants were resistant to glufosinate but not glyphosate. Each location chose the type of sensitive soybean used for bioindicator plants.
3. Is there any weather data associated with the applications (temperatures, RH, wind speed)? Still collecting weather data; can forward once I have it altogether if you'd like.
4. What time of day were the applications made? Time of day in which the application was made varied based on the availability of shared irrigation equipment
5. Any idea what the soil and water pH values were? Unsure
6. What are the units for the soil moisture values? Percent dry weight basis
 - i. $\theta_d = \frac{(\text{wt of wet soil}) - (\text{wt of dry soil} - \text{average bag weight})}{(\text{wt of dry soil} - \text{average bag weight})}$
7. Air samplers were placed ~6 in above the canopy. Any idea how high the canopy was? Unsure about canopy height at each location, but applications targeted R1 soybean, so a rough estimate on average heights is ~24".
8. What were the air sampler rates for the hi and low volume samplers (cfm, or whatever units are available)? University of Nebraska used low volume samplers, which were set at a flow rate of 3 L/min; high volume air samplers at other locations were set to maintain an average flow rate of ~250 L/min.
9. What filter media were used for the air samplers? Still working to confirm on the low volume sampler; I think it was: SKC P22692. High volume filter media were: Tisch high volume PUF media (TE-1015 7.62 x 3.81 cm) and 102 mm glass fiber filter paper (Hi-Q Environmental Products)

Please let me know if anything is unclear.

Best regards,
Meg

From: Bish, Mandy D. <bishm@missouri.edu>
Sent: Friday, May 01, 2020 4:22 PM
To: Hathaway, Margaret <Hathaway.Margaret@epa.gov>
Cc: Bradley, Kevin <bradleyke@missouri.edu>; Kenny, Daniel <Kenny.Dan@epa.gov>
Subject: Re: Dicamba EPA Check-In

Hi Meg,

You are correct. The most recent weather data sets include data from 29 stations; the publication included data from 3.

Attached is data from a collaborative study we conducted as part of a United Soybean Board project to address the question: does rainfall following a dicamba application reduce volatility?

I have been on maternity leave and honestly am behind of where I should be with summarizing this data. In the attached excel file, you will find sensitive bioassay plant data and soil moisture data from most locations. However, I lack the raw data for air sampling from many locations. I've shared what I have raw data for, and it's on my priority list to compile all of it once I return full-time next week. If there is any interest in that full data set, please reach out, I can send it along once I have it.

Thanks,
Mandy

Mandy Bish, Ph.D.

Extension Weed Specialist
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573-882-9878

From: "Hathaway, Margaret" <Hathaway.Margaret@epa.gov>
Date: Thursday, April 30, 2020 at 5:23 PM
To: "Bish, Mandy D." <bishm@missouri.edu>
Cc: "Bradley, Kevin" <bradleyke@missouri.edu>, "Kenny, Daniel" <Kenny.Dan@epa.gov>
Subject: RE: Dicamba EPA Check-In

Hello Mandy:

I spoke with the dicamba team and they say that reviewing this weather data would be a lower priority for OPP at the moment. If the data are handy and you can get it to us without a lot of effort, great, EFED agrees this could be helpful information. But if that's not the case and this would be a big ask, I'd advise you to hold off on submitting.

For the team's reference, however, I did get a question about how (if at all) this weather dataset overlaps with your 2019 article* on MS weather data that OPP has already seen. It sounds like the dataset you are describing now is much larger than what that article covered.

Take care,
Meg

*[Bish, M., Guinan, P, Bradley, K. 2019. Inversion Climatology in High-Production Agricultural Regions of Missouri and Implications for Pesticide Applications. JOURNAL OF APPLIED METEOROLOGY AND CLIMATOLOGY. 58:1973-1992]

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From: Bish, Mandy D. <bishm@missouri.edu>
Sent: Wednesday, April 22, 2020 3:12 PM
To: Hathaway, Margaret <Hathaway.Margaret@epa.gov>; Bradley, Kevin <bradleyke@missouri.edu>
Subject: Re: Dicamba EPA Check-In

Hi Meg,

Good questions. We have weather data for 2019 for 28 weather stations in MO, IN, IL, TN, AR, MS, and KY. Some of the Missouri weather stations have data going back as far as 2015. All but two of these weather stations are set up in soybean and/or cotton production areas where dicamba and the dicamba-tolerant traits have been or are anticipated to being used. We are monitoring relative humidity and air temperature at 18", 66", and 120" above ground level (AGL) and wind speed at 120" AGL. The data sets include 5-minute averages for each of these variables.

The heights at which we are recording measurements is the largest difference between our stations and national weather service data. We selected heights that are much closer to heights at which dicamba applications occur. My understanding is that the national weather service has temperature inversion data that is thousands of feet AGL, and wind speeds are typically recorded at ≥ 35 feet AGL.

I hope this helps. If you have any additional questions, please feel free to e-mail me or you can give me a call on my cell, which is 301-542-9638.

Thanks,
Mandy

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From: "Hathaway, Margaret" <Hathaway.Margaret@epa.gov>
Date: Wednesday, April 22, 2020 at 11:31 AM
To: "Bish, Mandy D." <bishm@missouri.edu>, "Bradley, Kevin" <bradleyke@missouri.edu>
Subject: RE: Dicamba EPA Check-In

Thank you, Mandy:
Before I ask my team about the weather data, I'd like to be able to describe the dataset in a bit more detail. For example, what is the time range of the data?

And when you say that the data isn't associated with any dicamba air sampling or experiments, could you please clarify how the data being collected differs from national weather service data? Perhaps the sampling is being taken directly from areas with the potential for dicamba concerns, such as agricultural fields (but just not ones where you conducted your other dicamba-related research), or forested areas?

I'm happy to chat over the phone if that would make things easier than trying to capture everything via email.

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From: Bish, Mandy D. <bishm@missouri.edu>
Sent: Wednesday, April 22, 2020 11:41 AM
To: Hathaway, Margaret <Hathaway.Margaret@epa.gov>; Bradley, Kevin <bradleyke@missouri.edu>
Subject: Re: Dicamba EPA Check-In

Meg,

Thank you for the clarification. I have a follow-up question. With the exception of the manuscript that Kevin mentioned and one additional study on rainfall, most of the remaining raw data we have is weather data. However the weather data is not associated with any dicamba air sampling or experiments, it is data we are collecting from over 20 weather stations in multiple geographies that are prone to dicamba movement. Is that data by itself of any value?

Thanks again for your time,
Mandy

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From: "Hathaway, Margaret" <Hathaway.Margaret@epa.gov>
Date: Wednesday, April 22, 2020 at 9:20 AM
To: "Bradley, Kevin" <bradleyke@missouri.edu>
Cc: "Bish, Mandy D." <bishm@missouri.edu>
Subject: RE: Dicamba EPA Check-In

Thank you, Kevin. I know the submissions took a lot of work to put together, especially when considering how busy you and everyone else already is, but I know this is extremely important to you like it is to us. If there is more information that will become available, either as a pdf or raw data, that is great. If not, what you've already provided is much appreciated.

- Meg

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From: Bradley, Kevin <bradleyke@missouri.edu>
Sent: Monday, April 20, 2020 8:45 PM
To: Hathaway, Margaret <Hathaway.Margaret@epa.gov>
Cc: Bish, Mandy D. <bishm@missouri.edu>
Subject: Re: Dicamba EPA Check-In

Margaret, thanks for the clarification. We'll try to get some more raw data to you if possible. To be honest, I'm not sure how much more we even have that might be of use to EPA. I think we've sent just about everything. I've copied Mandy Bish on this email. We just had one other paper accepted (but not published yet) that she may like to send something to you all. It might be a pdf or perhaps some of the raw data.

Kevin

From: "Hathaway, Margaret" <Hathaway.Margaret@epa.gov>
Date: Friday, April 17, 2020 at 3:12 PM
To: "Bradley, Kevin" <bradleyke@missouri.edu>
Subject: RE: Dicamba EPA Check-In

Hello Dr. Bradley:
Thank you very much for the provided dicamba data.

EPA understands and appreciates the desire for the academics to publish their data and it is not EPA's intent to undermine this goal. It seems there may be a misunderstanding with regards to EPA's desire for the raw data in Excel sheets, for which I apologize. If an academic has published their data in a journal, EPA attempts to use it in its assessment in accordance with our guidance for use of published, non GLP information. However, EPA's major concern is we must complete our assessment by early fall, which, based on discussions at the WSSA meeting, was going to occur before folks could publish their findings.

In order for EPA to include the valuable work being done by the WSSA, our thought was that if the raw data were available in a spreadsheet form, it would be easy to provide and easy to use. Prior to the last assessment, EPA received a large amount of research data in various formats that took a lot of time to process so that it could be used in the assessment. If this is not possible and is causing you and others concern, then EPA will accept the data in whatever form you can provide it to us and we will do our best to use it in the assessment.

Sincerely,
Meg

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From: Bradley, Kevin <bradleyke@missouri.edu>
Sent: Wednesday, April 08, 2020 9:25 AM
To: Hathaway, Margaret <Hathaway.Margaret@epa.gov>; Bish, Mandy D. <bishm@missouri.edu>
Subject: Re: Dicamba EPA Check-In

Margaret, thanks for your note. We will try to help you as much as we can, but as I mentioned to you (and several others at EPA) previously, all of our work pertaining to dicamba off-target movement has been or is being published in peer-reviewed journals for all of the scientific community to see and that is why we do all this. It is disconcerting to hear that EPA doesn't really utilize the information we put out there in these articles but instead needs excel sheets of raw data. It is extremely time-consuming for us to try to get all the raw data to you all in a way that someone not familiar with it can understand

what is going on. Having said that, I did have one of our research specialists compile the data that went into the attached article that was published in Weed Technology pertaining to trees.

Dr. Bish is on maternity leave. When she returns, I don't know if she will have much time to assemble this kind of information in either of the two articles she was the lead author on (also attached), as the field research season is already in full swing. Prior to the last dicamba decision that you all made, we had already sent the air sampling data to EPA that is in the attached article that was published in the Journal of Environmental Quality.

FYI, I've included 2 other articles that have been accepted, but not published yet, in the journal of Hort Technology and Pest Management Science.

The only other active research we have that I can think of is a bulk deposition (rainwater) sampling experiment we did last year and will be continuing this year. So we only have one year of results but we intend to publish this as well obviously. All I can provide on that is a pdf of the poster that was presented at our national WSSA meeting a few months ago.

I recognize this information is not in the format that you all were wanting but I hope it might help in some way.

Kevin Bradley

From: "Hathaway, Margaret" <Hathaway.Margaret@epa.gov>

Date: Tuesday, April 7, 2020 at 8:52 AM

To: "Bradley, Kevin" <bradleyke@missouri.edu>, "Bish, Mandy D." <bishm@missouri.edu>

Subject: Dicamba EPA Check-In

Hello Dr. Bish and Dr. Bradley:

I hope you and yours are doing well and are in good health. I wanted to check in and confirm that my office is still interested in any dicamba data you may be able to share with EPA. As a reminder, we would need to receive those data by May 1st in order to have time to review the submissions.

I also wanted to share replies from EFED to two common questions I have fielded from other researchers (with EPA replies in red):

1. If I have it, does EFED want to see both bioassay data as well as flux and air concentration data?
 - a. Yes, EFED would like to see both of these types of data.
2. Does EFED have a preference on units?
 - a. No, as long as they are clearly specified, EFED doesn't have a preference on units of measurement.

I realize these are highly unusual times. Please let me know if you have any questions for my colleagues or if there's anything else with which we could help.

Take care,

Meg

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From: Hathaway, Margaret
Sent: Thursday, February 27, 2020 8:26 AM
To: Bradley, Kevin <bradleyke@missouri.edu>; Bish, Mandy D. <bishm@missouri.edu>
Cc: Meadows, Sarah <Meadows.Sarah@epa.gov>; Schmid, Emily <Schmid.Emily@epa.gov>; Kenny, Daniel <Kenny.Dan@epa.gov>
Subject: RE: Dicamba Research Follow-Up - Bish and Bradley

Thank you very much! As you work on submitting the data, let me know if any questions come up and I can discuss with EFED as needed.

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From: Bradley, Kevin <bradleyke@missouri.edu>
Sent: Wednesday, February 26, 2020 9:25 PM
To: Hathaway, Margaret <Hathaway.Margaret@epa.gov>; Bish, Mandy D. <bishm@missouri.edu>
Cc: Meadows, Sarah <Meadows.Sarah@epa.gov>; Schmid, Emily <Schmid.Emily@epa.gov>; Kenny, Daniel <Kenny.Dan@epa.gov>
Subject: Re: Dicamba Research Follow-Up - Bish and Bradley

Margaret, we'll try to get you as much of the raw data from the studies we have already published and shared with you as we can before May 1. Thanks.

Kevin Bradley

From: "Hathaway, Margaret" <Hathaway.Margaret@epa.gov>
Date: Wednesday, February 26, 2020 at 4:49 PM
To: "Bish, Mandy D." <bishm@missouri.edu>, "Bradley, Kevin" <bradleyke@missouri.edu>
Cc: "Meadows, Sarah" <Meadows.Sarah@epa.gov>, "Schmid, Emily" <Schmid.Emily@epa.gov>, "Kenny, Daniel" <Kenny.Dan@epa.gov>
Subject: Dicamba Research Follow-Up - Bish and Bradley

Hello Dr. Bish and Dr. Bradley:

Thank you once again for participating in the Dicamba EPA-WSSA Research Update Day on January 16th. My coworkers and I truly appreciated the opportunity to learn more about your research. Thank you for the time and effort you put into sharing your work.

On that note, my colleagues in OPP's Environmental Fate and Effects Division have informed me they are interested in learning in more detail about your research on dicamba and apple, red maple, peach, pin oak, black walnut, grapes, and American elm. I've copied some guidance from EFED below detailing what type of submissions would be most helpful to my office, and I can serve as your primary point of contact for any information you may be able to provide. Please note that EFED anticipates only being able to consider data received by **May 1, 2020**.

OPP is trying to learn all that we can about this high-profile chemistry. Through your work, you and your colleagues in academia and the extension services know things about dicamba that we in EPA currently do not. While I can't guarantee that all the data my office receives by May will ultimately be cited in EPA's forthcoming work on dicamba, we want to learn from you and close our knowledge gap as much as feasible.

Thank you and best wishes,
Meg

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DICAMA DATA SUBMISSION GUIDANCE

EFED has considered the information that WSSA presented to the Agency on January 16, 2020 and how the studies may be integrated into the upcoming dicamba reevaluation. Given the current timelines, EFED will need to receive all data and information from WSSA by May 1, in order to consider them fully for use in our assessment. With this timeline in mind, the most important information requested are the raw data and the descriptions of the study designs. To the extent possible, any summary reports (draft or published) would be very appreciated.

1. The following information is requested, to the extent possible:
 - We would like the raw data results for the studies. The raw results should include all measurements of plant effects (visual injury, plant height, yield) that were collected, as well as all meteorological data collected, and any exposure estimates or residue data, whether from plants or deposition cards or puffers. Spreadsheets would be nice.
 - For all studies where the raw data is submitted to the Agency, EFED would like to have the protocol that was developed for the design of the study. This doesn't have to be a formal protocol, but one where EFED can identify:
 - what the purpose of the study was,
 - what measurements were scheduled to be taken,
 - what formulations/products were going to be used and how they were to be used,
 - when applications were going to occur.
 - Field size, layout, slope, soils,
 - Plots and transects (length, position, plot distances, number of plants sampled for height per plot),
 - deposition monitoring, air monitoring, temperature,
 - rainfall (amount and days relative to application);
 - soybean varieties tested;
 - If available, a summary of the results, these can be preliminary
 - If available, preliminary or final conclusions. EFED is also interested in understanding any major questions or uncertainties the researchers may have relative to the observations in the study (e.g., any signs of damage that didn't fit the assumption of greatest near edge of field; wider landscape damage beyond the transects; impact of rainfall on runoff or volatility exposures)
2. In the case of studies where damage associated with runoff was either observed or directly tested, to the extent possible, EFED would ask the individuals who observed these effects in their studies to provide the following information:
 - A summary of Observed Damage related to Runoff
 - Cite the main study where this was observed; if not part of a study mentioned above, please briefly summarize the design,

- observations relative to the study, raw data if available, time of irrigation or rainfall event relative to spray, any evidence supporting runoff related exposure
 - timing and extent of damage
 - discussion of nature of runoff pattern relative to damage observed (field slope etc...)
 - preliminary or final conclusions
 - major questions and uncertainties relative to the runoff related damage
3. If there are published or draft scientific papers that were part of the discussion, or left out of the discussion, and are believed by the presenting WSSA members as being pertinent to the upcoming reevaluation, EFED would like copies of these along with their raw data.
 4. At this point in time, given our limited resources, EFED is not interested in the low tunnel studies.